SR 14 Woodard Creek Bank Stabilization
Southwest Region

2004 MONITORING REPORT

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List of Acronyms

Acronym	Meaning
CI	Confidence Interval
ECY	Washington State Department of Ecology
FAC	Facultative Indicator Status
FACW	Facultative Wetland Indicator Status
IP	Individual Permit
MP	Mile Post
NWP	Nationwide Permit
OBL	Obligate Wetland Indicator Status
SR	State Route
USACE	United States Army Corps of Engineers
WDFW	Washington Department of Fish and Wildlife
WSDOF	Washington Department of Fisheries
WSDOT	Washington State Department of Transportation

Introduction

Infrastructure improvements including highway construction projects, highway interchanges, and bridges have accompanied economic and population growth in the state of Washington. The Washington State Department of Transportation (WSDOT) evaluates the potential for degradation of critical areas that may result from these infrastructure improvements. WSDOT strictly complies with applicable federal, state, and local environmental regulations, including the Clean Water Act and the state "no net loss" policy for wetlands (Executive Order 89-10). Generally, mitigation sites are planned when transportation improvement projects adversely affect critical and/or sensitive areas. The WSDOT Wetland Assessment and Monitoring Program monitors these mitigation sites as a means of evaluating compliance with permit conditions and tracking site development.

The purpose of this document is to report the status of the SR 14 Woodard Creek Bank Stabilization mitigation site with respect to permit compliance and success standards for 2004 (Map 1). Following a general description of our process and methods, this report documents recent management activities and current year monitoring results for the mitigation site.

Process

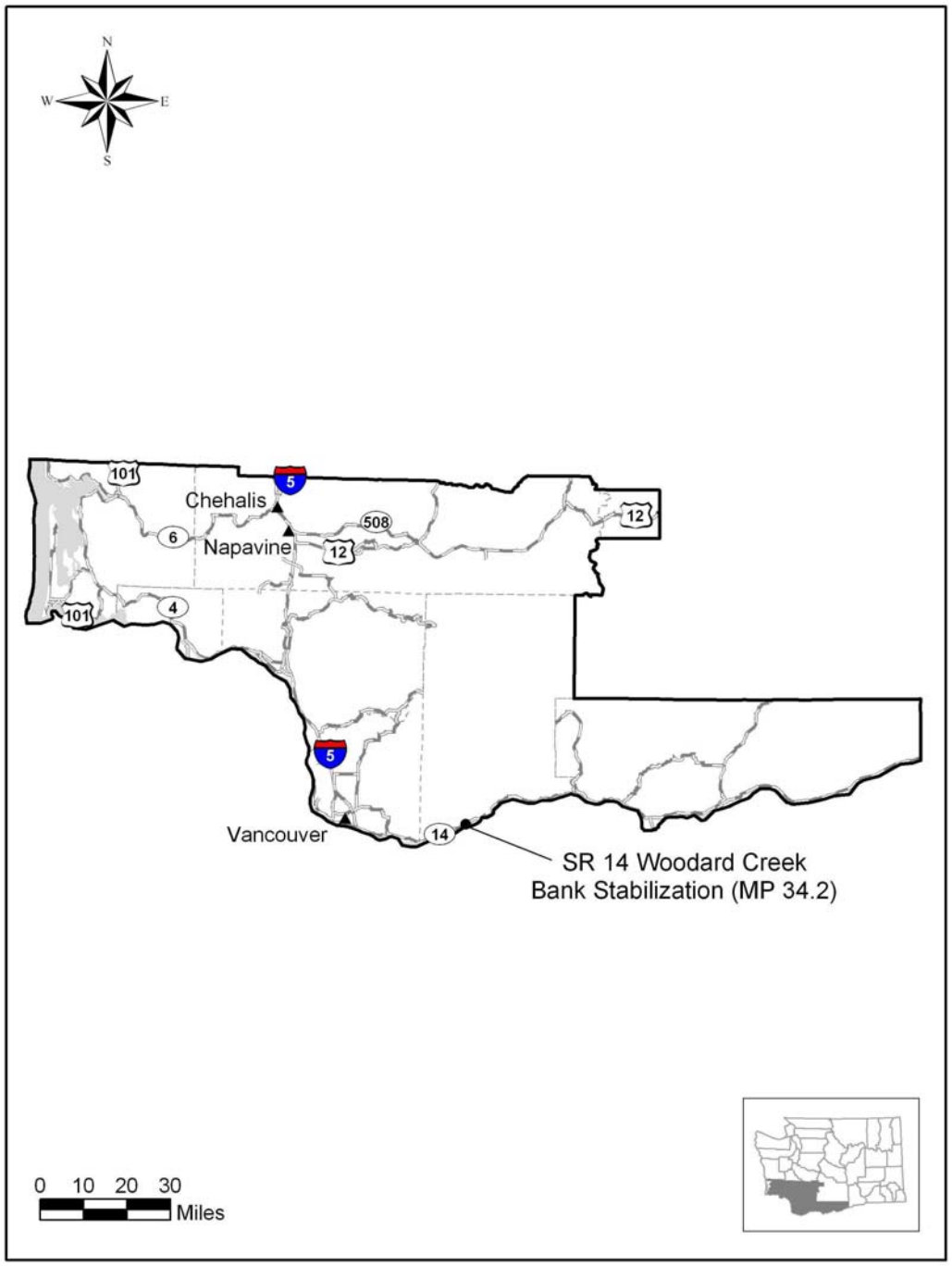
Monitoring typically begins the first spring after a site is planted and continues for the time period designated by the permit or mitigation plan. The monitoring period generally ranges from three to ten years. In special cases sites may be monitored beyond the designated monitoring period.

Monitoring activities are driven by site-specific success standards detailed in the mitigation plan or permits. Data are collected on a variety of environmental parameters including vegetation, soils, hydrology, and wildlife. When data analysis is complete, information on site development is communicated to region staff to facilitate management activities as part of an adaptive management process. Monitoring reports are issued to regulatory agencies and published on the web at:

http://www.wsdot.wa.gov/environment/wetmon/MonitorRpts.htm

Map 1

SR 14 Woodard Creek Bank Stabilization Mitigation Site Location



Skamania County

SR 14 Woodard Creek Bank Stabilization
USACE NWP 2001-4-00664

Photo 1 Developing *Salix* species stabilizing the bank at the SR 14 Woodard Creek Mitigation Site (August 2004).

SR 14 Woodard Creek USACE NWP # 2001-4-00664

This report summarizes the monitoring activities completed by the Washington State Department of Transportation (WSDOT) at the SR 14 Woodard Creek Bank Stabilization (SR 14 Woodard Creek) mitigation site from fall of 2003 through fall of 2004 (Photo 1). WSDOT Wetland Monitoring and Assessment Program activities were intended to address the permit requirement and the success standard. These activities include vegetation surveys and photo documentation. Table 1 provides general site information and Table 2 summarizes this year's monitoring results.

Table 1 General Information for the SR 14 Woodard Creek Mitigation Site

USACE NWP Number 3 and 23	2001-4-00664
WDFW HPA Permit Number	00-E6841-03
Township/Range/Section (impact)	T.02 N/R.06 E/S.26,
Mitigation Location	SR 14, Mile Post 34.2, Vancouver, Skamania County
Construction Date	2002
Initial Monitoring Period	2003 - 2005
Year of Monitoring	2 of 3
Area of Project Impact	2001 flood caused bridge damage
Type of Mitigation	Bank stabilization and Riparian Re-vegetation
Area of Mitigation	0.004 acres

Table 2 Monitoring Summary for SR 14 Woodard Creek Mitigation Site

Performance Criteria	2004 Results
Permit Requirement (2003-2005)	
Ensure 80% survival of species in riparian area	28% survival (total count)
Success Standard (2003-2005)	
Irrigation system functioning in bank stabilization area	Present

Success Standard and Permit Requirement

The permit requirement for the SR 14 Woodard Creek mitigation site is contained in the WDFW HPA, and the success standard was obtained from communications with the region (Dan Corlett e-mail June 7, 2004) (Appendix 1). Appendix 2 shows the site plan (WSDOT 2001) and photo locations.

Permit Requirement

Vegetative cuttings shall be planted at a maximum interval of 3 feet on center and maintained as necessary for 3 years (2003-2005) to ensure an 80% survival. (note: This refers to those planted above the bank structure in the riparian area, not the willows used in bank stabilization.)

Success Standard
Satisfactory operation of an irrigation system to ensure the survival of plant material used in the engineered bank structure (willows) (2005).

Methods

A total count of riparian species was conducted to assess survival of planted trees and shrubs in the riparian area. Woody species were identified and recorded as alive or dead on the top of the bank stabilization area (permit requirement).

Qualitative observations were made to assess the effectiveness of irrigation along the bank stabilization zone (success standard). General health and vigor of vegetation on the bank slope (the areas being irrigated) were recorded.

Photographs were obtained from two permanently identified locations to aid in documentation of site development over the monitoring period (Appendix 2).

Results and Discussion

This site was created in response to a flood event that occurred in 2001. The original bank was washed out and the SR 14 Bridge that passes over Woodard Creek was damaged. The bank was stabilized using boulders and woody debris was placed in Woodard Creek to reduce erosion (Appendix 1). *Salix* species (willows) cuttings were installed in a multiple lift vegetated geogrid to rebuild and stabilize the bank, and woody vegetation was established in a riparian area above the bank structure. The riparian planting area used to be an access road and remains compacted, and does not support vigorous plant growth. A discussion of specific requirements of the mitigation plan and permit requirements follows.

Permit Requirement – 80% Survival at Year 3 (2005).
Trees and shrubs were planted on the top of the bank in the fall of 2002. Based on the 2004 total count, survival of planted species is 22% (127 of 575 planted stems were alive (Photo 2). This area will be replanted during the winter of 2005 to meet the permit requirement. Table 3 lists the five planted woody species observed. This table also lists recruited native woody species that will add to the cover provided by planted species in the future.

Photo 2 Riparian plantings at SR 14 Woodard Creek (August 2004)

Table 3 Woody Species Observed in the Riparian Area at SR 14 Woodard Creek Mitigation Site (2004).

Scientific Name	Common Name	Alive	Installed Winter 2002-2003
Planted Species			
Physocarpus capitatus	Pacific ninebark	49	100
Rubus spectabilis	salmonberry	23	350
Sambucus nigra	blue elderberry	7	15
Symphoricarpos albus	snowberry	41	100
Thuja plicata	western red cedar	6	10
Unknown (dead)			
Total Planted	**5 species**	**126**	**575**
Volunteer Species			
Abies grandis	Grand fir	1	-
Fraxinus latifolia	Oregon ash	1	-
Pseudotsuga menziesii	Douglas-fir	1	-
Salix spp.	willows	9	-
Total Observed	**4 species**	**138**	**575**

Success Standard – Irrigation System Benefits Willows in Bank Stabilization Area (2005)

Salix species (Photo 3) installed in the bank stabilization areas appear to be healthy and thriving and qualitatively provide about 80% aerial cover. This suggests irrigation is having a positive impact on the bank stabilization area.

Continued irrigation should allow the *Salix* species found along the bank stabilization area to establish into thickets. This may be sufficient in meeting the standard. Evidence of erosion on the bank slopes was not noted.

Photo 3 ***Salix*** **species in the planting area the SR 14 Woodard Creek Mitigation Site (August 2004)**

Management Activities

WSDOT plans to replant the upper bank area with woody species during the winter of 2005 to meet the survival standard for 2005. The irrigation system will be adjusted to provide more thorough coverage of both the bioengineered bank and riparian planting area.

Additional Information/Other Observations

Based on a qualitative estimate, aerial cover by invasive species was less than 5%. Most of this cover was observed at the edges of the mitigation site. Patches of *Rubus armeniacus* (Himalayan blackberry) are present around the outer edges of the site, especially along the banks of the stream. *Phalaris arundinacea* (reed canarygrass)**,** *Leucanthemum vulgare* (oxeye daisy), *Hypochaeris radicata* (hairy catsear), *Hypericum perforatum* (common St. Johnswort), *Cirsium vulgare* (bull thistle), *P. arundinacea*, and *Daucus carota* (Queen Anne's lace) were also observed at trace levels on site. Invasive species do not appear to pose a threat to site development at this time.

Appendix 1 – SR 14 Woodard Creek Bank Stabilization Permit Requirements

Hydraulic Project Approval 00-E6841-03. July 3, 2002. Washington Department of Fish and Wildlife.
Point 1a: Revegetation shall be completed no later than November 15, 2002, and shall be monitored through November 15, 2005.
Point 16 requires "**Vegetative cuttings shall be planted at a maximum interval of 3 feet on center and maintained as necessary for 3 years to ensure a 80% survival."**

USACE. 2001-4-00664. 23 July, 2002.
NWP 3 and NWP 13 authorize bank maintenance and bank stabilization.
P. 2, point 3 "Permittee shall minimize the disturbance of existing vegetation in the project area and, following construction revegetate disturbed areas with native plant species."

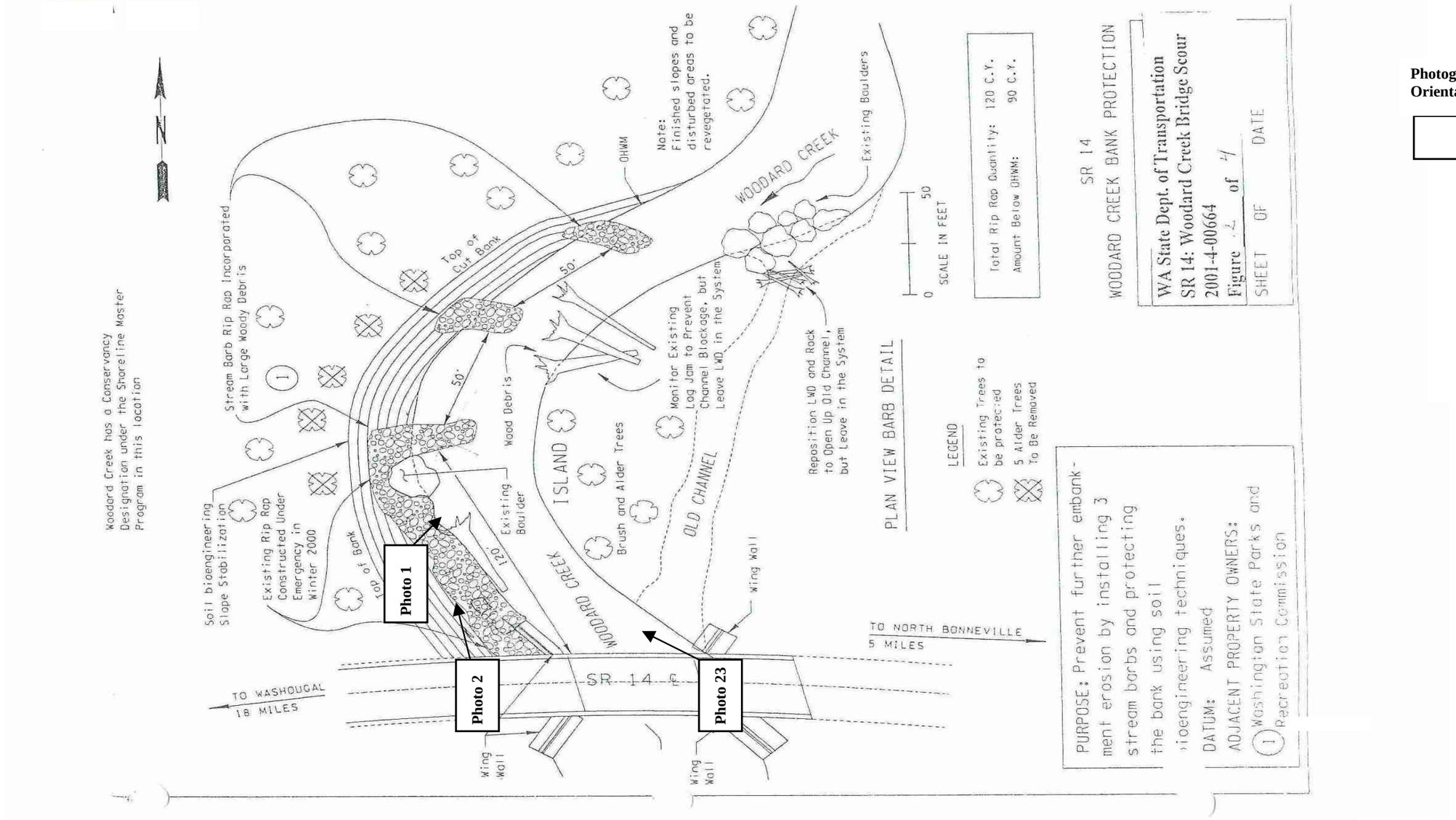
Success Standards

A mitigation plan with formal success standards was not written for this site. The following excerpt is from communications with the region (Dan Corlett e-mail June 7, 2004). The performance criteria addressed this year are identified in **bold** font.

Success Standard:
Satisfactory operation of an irrigation system to ensure the survival of plant material used in the engineered bank structure (willows).

Appendix 2 – SR 14 Woodard Creek Planting Plan

(WSDOT 2001)



Photograph location and Orientation

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